7th Grade Biomechanics – The Basics

**Key Vocabulary**

- **Tendon** – strong, tough tissue that connects muscles to bones
- **Flexion (Contraction)** – when the muscle contracts, shortens, or pulls tight together
- **Extension** – when a muscle relaxes and releases its tension
- **Flexor** – the name for the muscle that pulls a joint closed
- **Extensor** – the name for the muscle that pulls a joint open

**The 4 Basic Joints**

<table>
<thead>
<tr>
<th>Hinge</th>
<th>Ball &amp; Socket</th>
<th>Ellipsoidal</th>
<th>Pivot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only open and close motion</td>
<td>Widest range of motion</td>
<td>All motion but rotation</td>
<td>Only rotation motion</td>
</tr>
<tr>
<td>Knee Joint</td>
<td>Shoulder Joint</td>
<td>Wrist Joint</td>
<td>Neck Joint</td>
</tr>
</tbody>
</table>

**How it works!**

When the body wants to open and close the elbow joint it starts with your brain sending a signal to your muscles. When that signal makes it to your bicep muscle, it pulls tight together and closes the elbow. Because the bicep closes the joint, it is called a flexor. The same process occurs when the arm opens, but this time the triceps flexes and the elbow joint opens. The triceps in this case are called the extensor muscle. When a joint moves it always has at least two sets of muscles making the motion because muscles can only pull, they can never push a joint open! Also, muscles are always attached to bones with tendons in two different locations. One location is above the joint. The other location is below the joint. For example, the bicep is connected at the humerus bone above the joint, and the radius bone below the joint.